

Enhancing organizational dynamics and productivity by design:
A Steelcase – Georgia Tech Research Collaboration

A comparison between Thoughtform (TF) and Smith Carter (SC)

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1. Scope

We briefly compare the profile of ThoughtForm, as extensively discussed in the article submitted to *Environment and Behavior* in early February 2006, and Smith Carter. The purpose is to make our description of the two organizations consistent. Thus, this note complements the research reports submitted at the end of 2005. The note is linked to a Powerpoint presentation of key findings (attached: *TF and SC compared 17March 06*).

2. Change in the connectivity of the layouts (slides 3-5 for TF and 13-15 for SC)

Line map representations of the layouts of each organization before and after the change of premises were prepared. In both cases the new layouts are associated with increases in connectivity. In ThoughtForm Integration moves from 1.455 to 1.684 and in Smith Carter it moves from 1.634 to 1.858. In addition, in both cases the new layouts are associated with the creation of very powerfully connected lines - the "street" in ThoughtForm and the main circulation spines in Smithcarter. These lines stand out in the distribution plots.

We note a critical difference which is not captured by the numbers. In ThoughtForm, the "street" is associated with, and even crosses through, key spaces of shared use. This is not true in the case of Smith Carter, where the strongly connected lines traverse essentially neutral territory.

We also note that in the case of ThoughtForm, the strongly connected lines are the only means to move across the premises, along the length of the building. In the case of Smith Carter, there are alternatives ways to move, using the broken paths that traverse the work areas between the strongly connected lines.

Thus, the two layouts differ in the manner in which strongly connected lines are "invested" by program and are treated as major channels of movement.

3. Changes in the relationship between local and global connectivity (slides 6 for TF and 16 for SC)

We computed the correlation between the local connectivity of lines ("Degree" which expresses the number of intersection each lines has with other lines) and the global connectivity ("Integration" which expresses the number of direction turns required to go from a line to all other lines in the system). This correlation is treated as an objective measure of a systems intelligibility, because it describes how well the properties of space that can readily be perceived are statistically linked to more abstract relations that can only be cognized. For both cases there is an increase in the correlation. In ThoughtForm r^2 moves from 0.399 to 0.813 while in Smith Carter it moves from 0.326 to 0.595. The lesser improvement of the correlation in Smith Carter indicates that the layout, while quite easy to look across (open plan) is not as clearly ordered and as directly understandable as the layout in ThoughtForm.

4. Changes in employee perceptions and reported satisfaction with the work environment (slides 7 for TF and 17 for SC)

In both cases there reported employee satisfaction with the work environment is greater at the new premises. In ThoughtForm the strongest improvements in satisfaction are associated with access to quiet spaces (+53%), access to team rooms (+32%), access to casual spaces (+32%) and the quality of design of team spaces (+29%). In Smith Carter, the strongest improvements are associated with access to casual spaces (+47%), quiet spaces (+30%), and views (29%). Overall, levels of satisfaction are higher at ThoughtForm as are degrees of improvement.

It is our guess that the difference reflects the fact that there was greater clarity and also greater consensus regarding the manner in which the work environment should support work process at ThoughtForm than there was at SmithCarter. As noted in our reports, Smith Carter placed greater emphasis on the overall symbolic value of the workplace relative to company identity. At ThoughtForm there was more explicit consideration of the way in which workplace design affects every organizational practices and cultures of work and interaction.

5. Changes in network densities (slides 8 for TF and 18 for SC)

We computed unweighted network densities based on the original survey data. As discussed in the report, our aim was to capture the daily and weekly intervals and to express these as proportion of the total. Smith Carter is associated with much lower densities than ThoughtForm for all networks. Given that it is a considerably larger organization this is not surprising.

The tables show that in both cases there is a small decrease in the total density of all networks. In the case of ThoughtForm there is a seemingly paradoxical small increase of the overall density after the change of premises. As we argued in our reports, this simply indicates that there is less overlap between the networks after the move, so that smaller densities per network add up to a slightly larger overall density.

The most significant difference between the two organizations emerges when we look at the daily and weekly intervals. In ThoughtForm, all networks had a higher daily and weekly density after the move. Exactly the opposite is true in SmithCarter. As a consequence, the proportion of total density which is realized at the aggregate daily+weekly interval in ThoughtForm has gone up after the move, from 44% to 52%. In the case of Smith Carter the proportion has stayed the same, namely 61%. Thus, the new design is associated with a temporal intensification of interaction in ThoughtForm but not in Smith Carter – we use the term “intensification” to describe the increase in the frequency by which people interact with each other.

6. The spatial span of interaction (slides 9-10 for TF and 19-20 for SC)

We plotted the daily work network in space, to get a preliminary picture of how far the most basic interaction patterns span across the premises. No quantification is associated with this exercise. Developing quantifications is one of the task discussed for the next major phase of research, the development of sharper tools for analyzing the relationship between networks and layout. However, based on the visual image, it would appear that in the case of ThoughtForm a greater proportion of interaction spans longer distances across the premises. In Smith Carter, a greater proportion of interaction is relatively localized. This has a strategic implication. If we suppose at least some of the interaction to be face to face, the interaction patterns at ThoughtForm imply movement, and thus greater exposure to other people, visual displays and potential encounters. This is less true for Smith Carter. The paper submitted to *Environment and Behavior* discusses the theoretical significance of this in more detail.

7. Correlations between individual location and individual interaction densities (slides 11 for TF and 21 for SC)

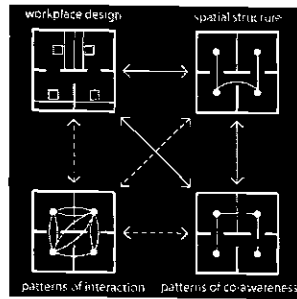
Our paper for *Environment and Behavior* notes that in the case of ThoughtForm, the move to the new premises is associated with the emergence of significant correlations between the social and work hub, gatekeeper and pulsetaker values associated with individuals, and the degree to which the location of the workplace of these individuals in the layout is Integrated (that is accessible with few direction changes). We suggested that this implies that the organization is made more “intelligible” by being “mapped” onto space in this manner.

No similar pattern is found in the case of Smith Carter. The relationship between an individual’s position in the network and an individual’s position in the layout seems as arbitrary after the move as it was before.

8. In a nutshell

There are some indications that the new layout at Smith Carter is less well “fine tuned” to support organizational practices that it is in ThoughtForm.

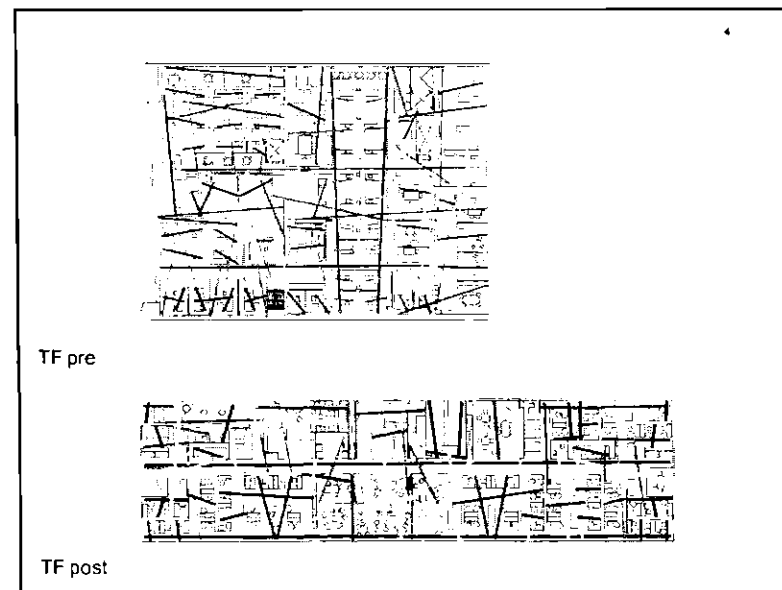
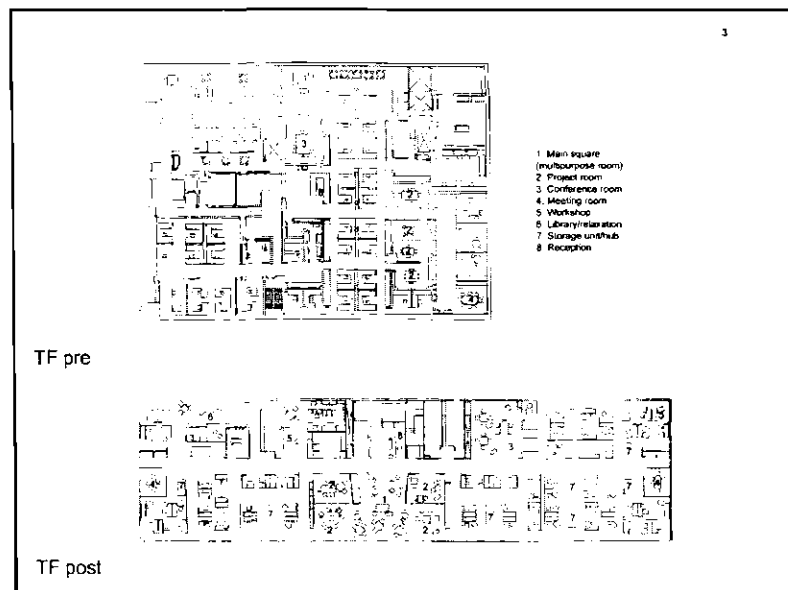
The development of even stronger analytical tools, and especially tools that help link network analysis an analysis of layout and workplace design, will help to sharpen up Community-Based Planning so as to better support the fine tuning of layout to organizational practices and work process, when this is a desired aim.

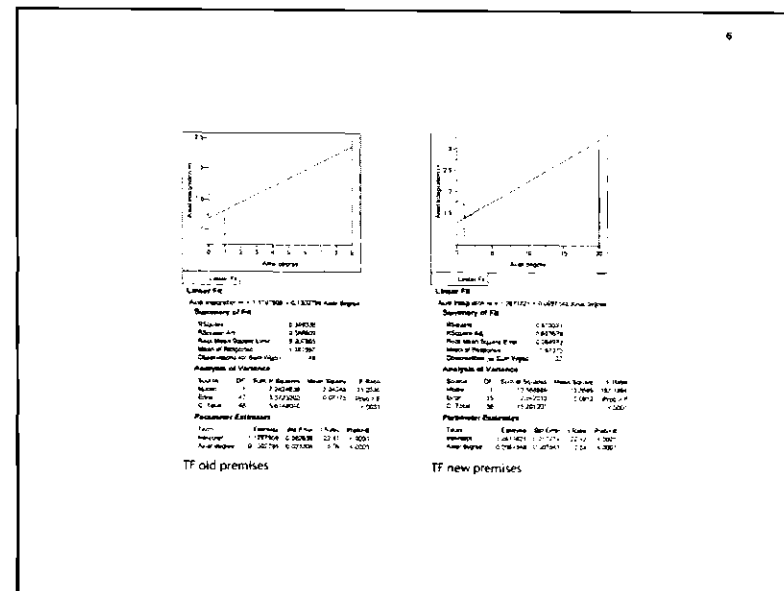
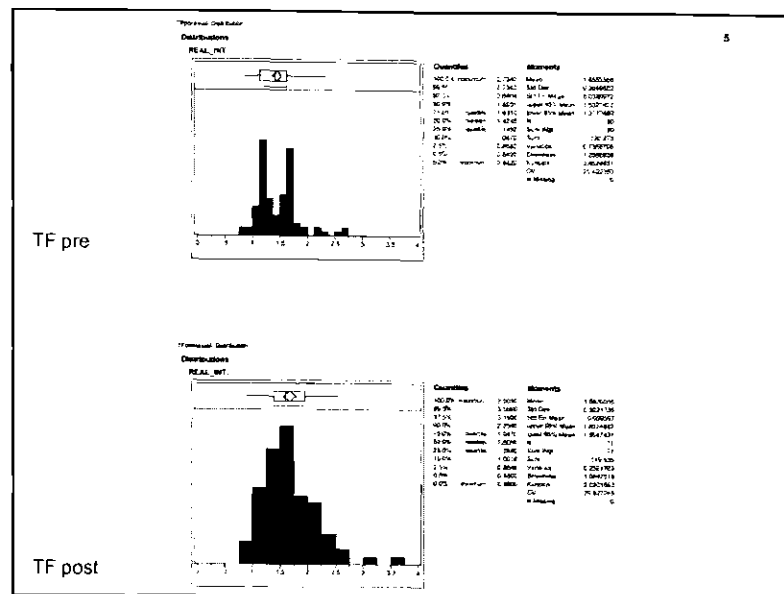


Comparison between TF and SC

30 May 2006 / jp-sb

Case 1: TF





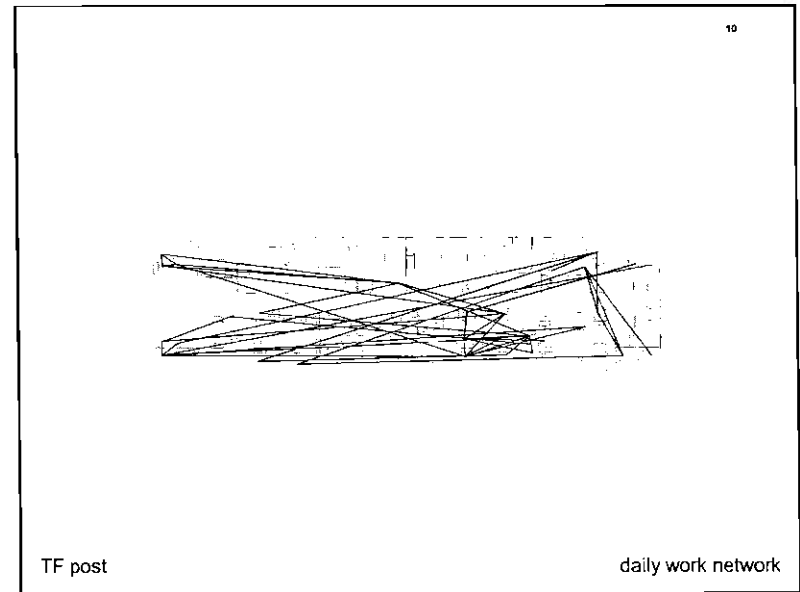
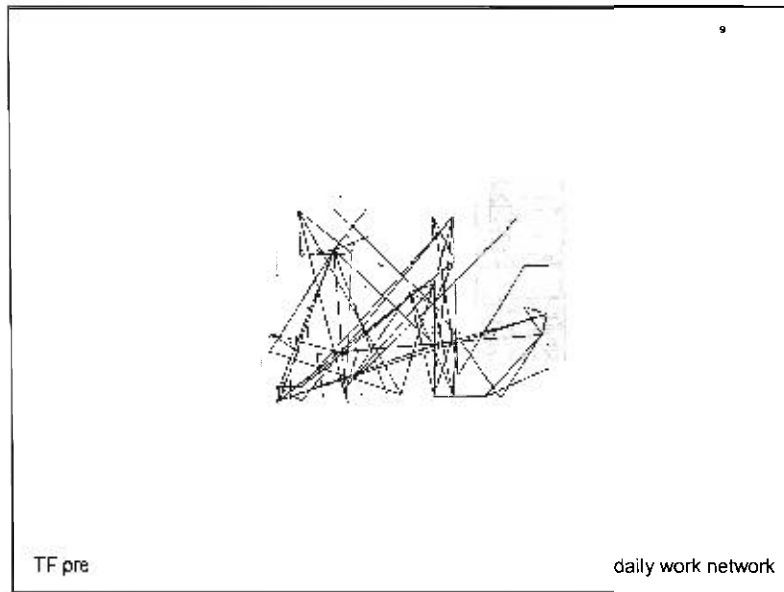
Agreement with the following statements	Pre	Post	Change
A variety of spaces are available to meet the needs of different activities	83%	94%	11%
I have access to quiet private spaces when I need them	38%	92%	53%
It is important that I am aware of other people's activity around me	63%	33%	-30%
I have a personal workspace that is designed to minimize distractions	32%	33%	1%
I frequently have "hallway" conversations with my co-workers	78%	69%	-9%
I can quickly access information that is relevant to my job	98%	100%	2%
I have a workspace that is designed and laid out to help me work effectively	56%	59%	13%
I have access to spaces for my unplanned meetings	95%	100%	5%
Meeting spaces are available when I am trying to schedule a meeting	98%	100%	2%
I have access to project or team rooms when I need them	68%	100%	32%
I have access to right technology to support collaboration with others	80%	89%	9%
The team spaces I use are designed and laid out to support teamwork	54%	83%	29%
I have access to spaces that support exchanging ideas with others	84%	94%	9%
I have access to casual spaces when I need to relax	51%	83%	32%
I can easily access food and beverages when I need	95%	97%	2%
The spaces I use are comfortable to work in	78%	86%	8%
I can easily locate the people I work with and places I use in buildings	100%	100%	0%
I am comfortable with the amount of natural light in the spaces I use the most	66%	89%	23%
I am pleased with the views I have from the spaces I use most	66%	83%	17%

TF

	Social	Working	Innovation	Improvement	Expert Advice	Decision Making	All
Unweighted network densities before the move	0.324	0.298	0.148	0.201	0.139	0.141	0.244
Unweighted network densities after the move	0.317	0.265	0.143	0.176	0.137	0.129	0.251

	Social	Working	Innovation	Improvement	Expert Advice	Decision Making	Total
Daily network densities before the move	0.061	0.035	0.012	0.025	0.015	0.011	0.071
Daily network densities after the move	0.083	0.042	0.013	0.026	0.013	0.012	0.106
Weekly network densities before the move	0.127	0.107	0.046	0.067	0.046	0.041	0.212
Weekly network densities after the move	0.137	0.126	0.051	0.076	0.053	0.042	0.233
Daily+Weekly Network densities before the move	0.189	0.142	0.058	0.092	0.061	0.053	0.283
Daily+Weekly Network densities after the move	0.220	0.167	0.063	0.101	0.066	0.054	0.338
(Daily+Weekly)/Total before the move	0.582	0.477	0.389	0.459	0.443	0.373	0.438
(Daily+Weekly)/Total after the move	0.693	0.630	0.442	0.577	0.484	0.420	0.521

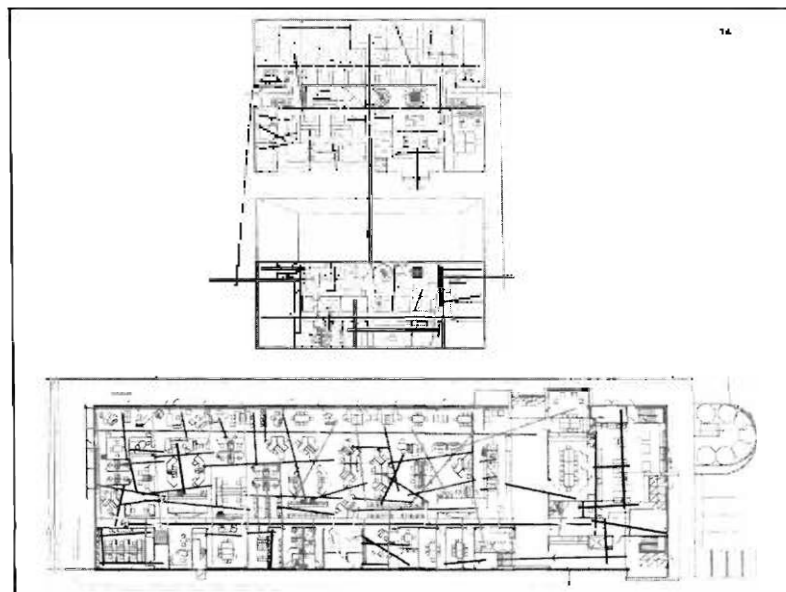
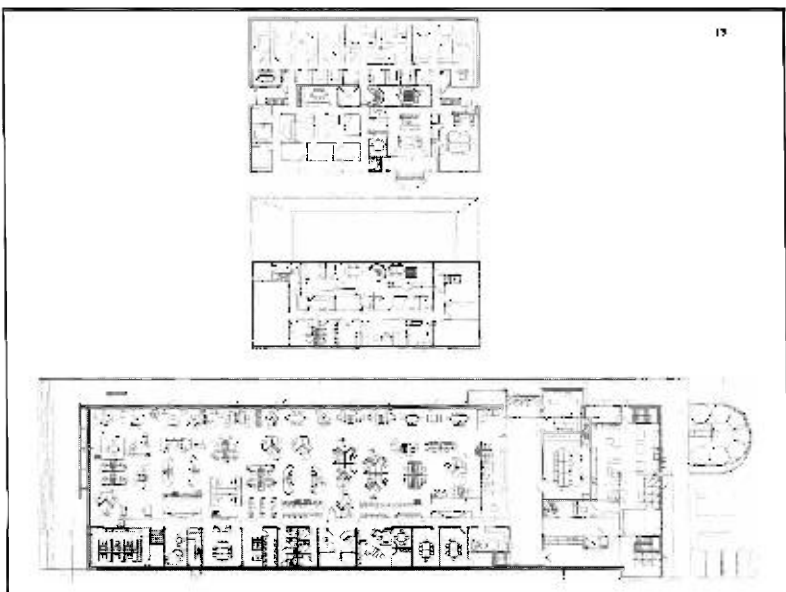
TF



Pearson Correlation Coefficient	Line Integration in Old Premises	Line Integration In New Premises
Social Hub Value	0.097 (0.51)	0.480 (0.003)
Social Gatekeeper Value	-0.161 (0.27)	0.471 (0.003)
Social Pulsetaker Value	0.037 (0.08)	0.506 (0.001)
Work Hub Value	-0.081 (0.58)	0.400 (0.014)
Work Gatekeeper Value	-0.083 (0.57)	0.613 (0.001)
Work Pulsetaker Value	-0.138 (0.34)	0.327 (0.048)

Kendall Correlation Coefficient	
Social Hub Rank before and after move	0.489 (0.000)
Social Gatekeeper Rank before and after move	0.254 (0.028)
Social Pulsetaker Rank before and after move	0.494 (0.000)
Work Hub Rank before and after move	0.456 (0.000)
Work Gatekeeper Rank before and after move	0.322 (0.006)
Work Pulsetaker Rank before and after move	0.422 (0.000)

Case 2: SC



Agreement with the following statements	Pre	Post	Change
A variety of spaces are available to meet the needs of different activities	52%	73%	21%
I have access to quiet private spaces when I need them	36%	66%	30%
It is important that I am aware of other people's activity around me	NA	NA	NA
I have a personal workspace that is designed to minimize distractions	NA	NA	NA
I frequently have "informal" conversations with my co-workers	73%	75%	3%
I can quickly access information that is relevant to my job	65%	78%	13%
I have a workspace that is designed and laid out to help me work effectively	60%	72%	12%
I have access to spaces for my unplanned meetings	60%	77%	17%
Meeting spaces are available when I am trying to schedule a meeting	56%	78%	12%
I have access to project or team rooms when I need them	NA	NA	NA
I have access to right technology to support collaboration with others	69%	79%	10%
The team spaces I use are designed and laid out to support teamwork	NA	NA	NA
I have access to spaces that support exchanging ideas with others	56%	75%	19%
I have access to casual spaces when I need to relax	28%	75%	47%
I can easily access food and beverages when I need	NA	NA	NA
The spaces I use are comfortable to work in	NA	NA	NA
I can easily locate the people I work with and places I use in buildings	NA	NA	NA
I am comfortable with the amount of natural light in the spaces I use the most	52%	62%	10%
I am pleased with the views I have from the spaces I use most	39%	68%	29%

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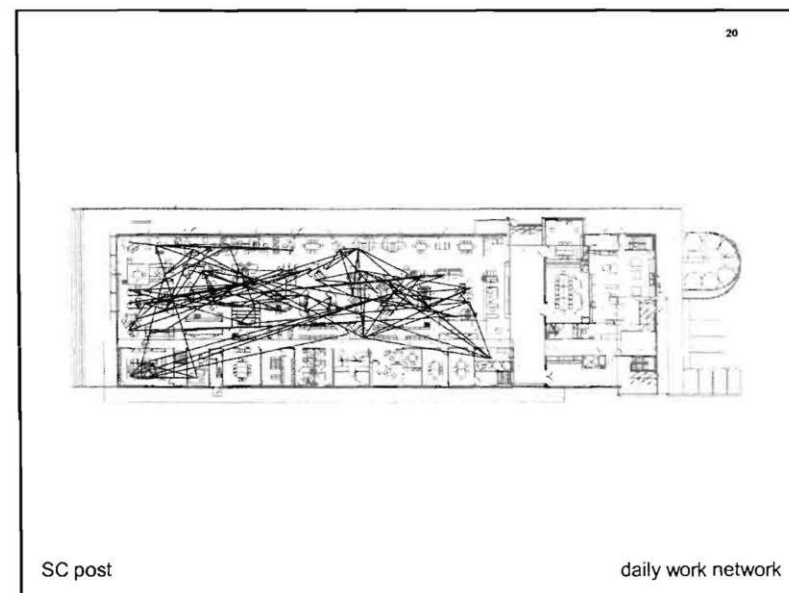
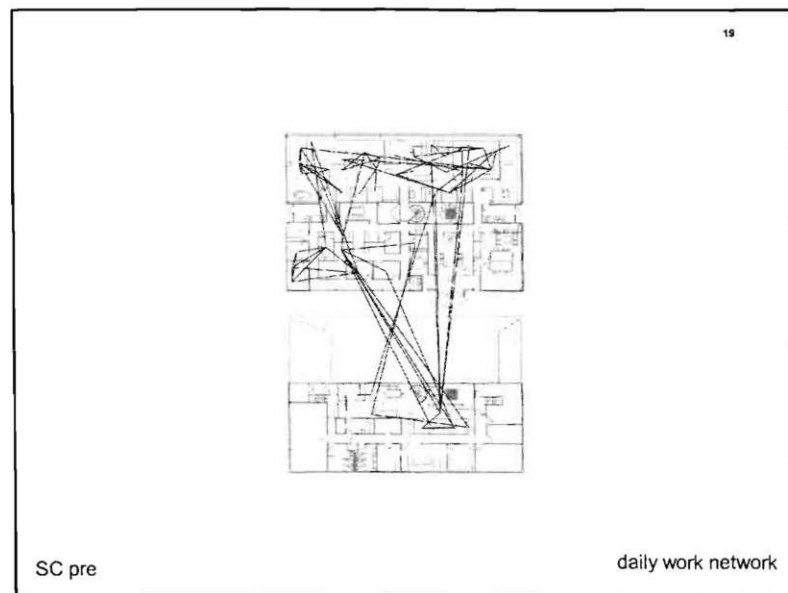
SC

	Social	Working	Innovation	Improvement	Expert advice	Decision making	All
Unweighted network densities before the move	0.138	0.143	0.082	0.104	0.061	0.060	0.174
Unweighted network densities after the move	0.116	0.116	0.065	0.083	0.067	0.064	0.147

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	Social	Working	Innovation	Improvement	Expert advice	Decision making	Total
Daily network densities before the move	0.030	0.025	0.010	0.016	0.011	0.008	0.040
Daily network densities after the move	0.022	0.016	0.006	0.009	0.006	0.005	0.031
Weekly network densities before the move	0.051	0.047	0.022	0.034	0.024	0.023	0.093
Weekly network densities after the move	0.047	0.042	0.021	0.028	0.022	0.018	0.083
Daily+Weekly Network densities before the move	0.081	0.072	0.032	0.050	0.035	0.031	0.106
Daily+Weekly Network densities after the move	0.069	0.058	0.026	0.038	0.027	0.022	0.090
(Daily+Weekly)/Total before the move	0.59	0.50	0.38	0.48	0.43	0.39	0.61
(Daily+Weekly)/Total after the move	0.60	0.50	0.41	0.46	0.41	0.35	0.61

SC



Pearson Correlation Coefficient	Line Integration in old premises	Line Integration in new premises
Social Hub Value	0.000 (0.999)	-0.078 (0.486)
Social Gatekeeper Value	0.118 (0.428)	0.089 (0.417)
Social Pulsetaker Value	0.000 (0.949)	-0.127 (0.245)
Work Hub Value	0.000 (0.974)	-0.192 (0.076)
Work Gatekeeper Value	0.158 (0.292)	-0.138 (0.198)
Work Pulsetaker Value	-0.055 (0.699)	-0.267 (0.012)

Kendall Correlation Coefficient	
Social Hub Rank before and after move	0.498 (0.000)
Social Gatekeeper Rank before and after move	0.113 (0.105)
Social Pulsetaker Rank before and after move	0.355 (0.000)
Work Hub Rank before and after move	0.294 (0.000)
Work Gatekeeper Rank before and after move	0.169 (0.015)
Work Pulsetaker Rank before and after move	0.257 (0.000)

SC